

**(57) Abstract:** To eliminate a vertical inversion processing of an image in a mobile telephone having a video camera which can be used as a video camera and a television telephone. In the case in which a mobile telephone (1) having a video camera is to be used as a hands free mobile television telephone, a camera receiver unit (9) is brought into a state shown in the drawing. When the telephone (1) is to be used as a video camera, the camera receiver unit (9) is rotated by 180 degrees in the state shown in the drawing to turn the front face of a video camera section (10) toward the back face side of a body (2). When the telephone (1) is to be used as the mobile television telephone and is to be used as the video camera, the vertical relationship of the video camera is not changed. Therefore, a vertical inversion processing of an image signal is not required.

**DESCRIPTION****MOBILE INFORMATION COMMUNICATING TERMINAL DEVICE  
HAVING VIDEO CAMERA**

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BACKGROUND OF THE INVENTION

The present invention relates to a mobile information communicating terminal device having a video camera, and more particularly to a mobile information communicating terminal device having a video camera which does not require a vertical inversion processing of an image signal even if an object to be photographed is changed from a forward object of the device to a rearward object thereof.

A mobile telephone has rapidly spread with a development of multifunctionality, for example, a size can be reduced, a price can be cut down, and an electronic mail can be exchanged and internet can be accessed in addition to calling.

If a mobile telephone and a video camera are combined with each other and an image can be fetched and transmitted, the mobile telephone becomes more convenient to be utilized as the video camera and a mobile television telephone. As a composite device having a mobile telephone and a video camera combined with each other, JP-A-8-294030 has described a mobile telephone integrating type video camera, for example as shown in Fig. 9.

In the mobile telephone integrating type video camera, a camera

housing having a video camera, an ear speaker and a microphone mounted integrally thereon is pivotally supported on an upper part of a housing body to be rotatable (tiltable) in a horizontal direction. The video camera and the microphone are provided  
5 on the same plane and the ear speaker is provided on an orthogonal plane. When the mobile telephone integrating type video camera is to be used as a hand set type telephone, the ear speaker is turned toward a front face of a housing body and the video camera is caused to go around in the housing. Moreover, when the mobile  
10 telephone integrating type video camera is to be used as a hands free type television telephone for photographing a caller's face, a video camera is rotated toward the front face side of a housing body. When the mobile telephone integrating type video camera is to be used as a video camera for photographing  
15 an object present in a rear part, the video camera is rotated toward the back face side of the housing body.

In the mobile telephone integrating type video camera, the video camera is pivotally supported on the upper part of the housing body to be rotatable (tiltable) in the horizontal  
20 direction. Therefore, when the mobile telephone integrating type video camera is to be used as a television telephone for photographing his (her) own face and is to be used as a video camera for photographing an object present in a rear part, the video camera is vertically inverted. For this reason, when the  
25 mobile telephone integrating type video camera is to be used

as the television telephone and is to be used as the video camera, an image signal should be subjected to a vertical inversion processing.

Moreover, when the conventional mobile telephone  
5 integrating type video camera is to be used as the hands free type television telephone, the video camera is rotated toward the front face of the housing body, that is, the side on which a display section such as a liquid crystal to be a monitor screen is provided. Therefore, there has been a problem in that an  
10 image of a caller's face seeing the display section can be transmitted but an image of an object on the back face side of the housing body which is being seen by the caller, for example, an image of an accident spot, a scene of a fire or a beautiful scenery which is being seen by the caller cannot be transmitted  
15 through a monitor to carry out explanation with a relay from the spot toward a calling party by means of a television telephone.

#### SUMMARY OF THE INVENTION

The invention has been made to solve such a problem and  
20 has an object to eliminate a vertical inversion processing of an image signal in a mobile telephone having a video camera capable of being used as a video camera and a television telephone.

Moreover, the invention has an object to optionally turn  
25 a video camera toward an object on the front face of a housing

body and toward an object on the back face of the housing body at the time of the use for a hands free type television telephone.

The invention provides a mobile information communicating terminal device having a video camera, comprising a body and  
5 a camera receiver unit having a video camera and a receiver mounted thereon and pivotally supported in a vertical direction with respect to an upper edge face of the body. By this structure, the video camera can be rotated around an axis in a vertical direction of the body to carry out photographing.  
10 Therefore, at the time of the use as a television telephone for photographing a user's face and as a video camera for photographing an object present in a rear part, the vertical relationship of the video camera is not changed so that the vertical inversion processing of an image signal is not  
15 required.

Moreover, at the time of the use as a hands free type television telephone, it is possible to optionally transmit the image of an object on the front face of a housing body and to transmit the image of an object on the back face of the housing  
20 body.

#### BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view showing the appearance of the front face side of a mobile telephone having a video camera according to an embodiment of the invention;

25 Fig. 2 is a perspective view showing the appearance of

an upper portion on the back face side of the mobile telephone having a video camera according to the embodiment of the invention;

Fig. 3 is a sectional view showing a camera receiver unit  
5 of Fig. 1 taken along a plane perpendicular to an axis 13 which is seen from above;

Fig. 4 is a sectional view showing the camera receiver unit of Fig. 1 taken along a plane parallel with the axis 13 which is seen from the front;

10 Fig. 5 is a sectional view showing the camera receiver unit of Fig. 1 taken along the plane parallel with the axis 13 which is seen from a right side surface;

Fig. 6 is a sectional view showing the camera receiver unit of Fig. 1 taken along the plane parallel with the axis 13  
15 which is seen from a back face;

Fig. 7 is a sectional view illustrating the coupling structure of a housing of the camera receiver unit of Fig. 1;

Fig. 8 is a view illustrating the structure of an FPC of the camera receiver unit; and

20 Fig. 9 is a perspective view showing the appearance of the front face side of a mobile telephone having a video camera according to a conventional art.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

An embodiment of the invention will be described below  
25 with reference to the drawings.

Fig. 1 is a perspective view showing the appearance of the front face side of a mobile telephone having a video camera according to the embodiment of the invention, and Fig. 2 is a perspective view showing the appearance of the upper part of the mobile telephone with a camera receiver unit rotated by 180 degrees.

A mobile telephone 1 having a video camera has an almost flat rectangular parallelepiped body 2 which has an antenna 3 provided on the left side of an upper end and a head set jack 4 provided on the right side surface thereof. Moreover, various operation keys 6 are arranged from the almost central portion of the front face of the body 2 to a lower part, and a microphone 7 is provided in a lower edge portion. Furthermore, a display section 5 constituted by a color LCD is provided above the operation key 6. Moreover, a removable battery pack 8 is attached from the almost central portion of the back face of the body 2 to a lower part.

The upper edge portion of the body 2 is protruded at the right and the left, thereby forming a left upper edge portion 2a of the body and a right upper edge portion 2b of the body. An almost rectangular parallelepiped concave portion may be formed on the center of the upper edge portion of the body 2. A camera receiver unit 9 is provided between the left upper edge portion 2a of the body and the right upper edge portion 2b of the body. The camera receiver unit 9 mounts a video camera

section 10 and a receiver section 11 thereon. Moreover, an almost rectangular parallelepiped case is provided and has a light receiving face of the video camera section 10 provided on one of surfaces thereof and a voice output face of the receiver  
5 section 11 provided on the opposite surface. The camera receiver unit 9 is attached to the upper edge surface of the body 2 to be forward and reversely (clockwise and counterclockwise) rotatable around a vertical axis 13. Accordingly, the video camera section 10 can be rotated to carry  
10 out photographing.

The internal structure of the camera receiver unit 9 of the mobile telephone 1 having a video camera, which is basically constituted, as described above will be described with reference to Figs. 3 to 8. Fig. 3 is a sectional view showing  
15 the camera receiver unit 9 taken along a plane perpendicular to the axis 13 of Fig. 1 which is seen from above, Fig. 4 is a sectional view showing the camera receiver unit 9 taken along a plane parallel with the axis 13 which is seen from the front, Fig. 5 is a sectional view showing the camera receiver unit 9  
20 taken along the plane parallel with the axis 13 which is seen from a right side surface, Fig. 6 is a sectional view showing the camera receiver unit 9 taken along the plane parallel with the axis 13 which is seen from a back face (rear face), Fig. 7 is a sectional view illustrating the coupling structure of  
25 a housing of the camera receiver unit 9, and Fig. 8 is a view



illustrating the structure of an FPC (flexible printed board).  
For convenience, in the camera receiver unit 9, a surface turned  
toward the front face of the body in Fig. 1, that is, the light  
receiving face side of the video camera section 10 is set to  
5 be a front face and a forward portion.

As shown in Fig. 3, a camera unit printed board 33 is  
engaged through engaging portions 27 and 28 on the inside of  
the front face side of a camera receiver unit case 23. Moreover,  
a camera unit 31 having a lens system and an image pick-up element  
10 is mounted on the camera unit printed board 33. A camera cushion  
35 is inserted between a tip on the front face side of the camera  
unit 31 and an internal wall surface of the camera receiver unit  
case 23. Furthermore, a panel 34 formed of a transparent resin  
is provided in front of the camera cushion 35.

15 Moreover, a second stopper 36 is engaged through engaging  
portions 25 and 26 on the inside of the back/face side of the  
camera receiver unit case 23. A receiver 32 is mounted on the  
second stopper case 36. A receiver cushion 37 is inserted  
between the tip of the receiver 32 and the internal wall surface  
20 of the camera receiver unit case 23.

Concave portions 23a and 23b having longitudinal central  
portions narrowed slightly are formed in portions corresponding  
to both side surfaces of the camera receiver unit case 23, and  
a first stopper 21 protruded from the right upper edge portion  
25 2b of the body abuts on the concave portion 23b in Fig. 3. The

first stopper 21 presses the concave portion 23b of the camera receiver unit case 23 by the elastic force of a spring 22. Accordingly, when the camera receiver unit 9 is rotated around the axis 13 in the state shown in Fig. 1, the first stopper 21 is pressed by an external wall surface of the camera receiver unit case 23 and is then moved rightwards to compress the spring 22. When the camera receiver unit 9 is rotated by 180 degrees so that the concave portion 23a on the opposite side is opposed to the first stopper 21, the first stopper 21 is moved leftwards to press the concave portion 23a. In other words, the camera receiver unit 9 is stabilized in the state shown in Fig. 1 and a state obtained through a rotation by 180 degrees from the state of Fig. 1.

As shown in Figs. 4 to 7, a shaft 41 is attached to the center of a concave portion formed between the left upper edge portion 2a of the body and the right upper edge portion 2b of the body to be rotatable by approximately  $\pm 180$  degrees in the vertical direction of the body 2. The camera receiver unit case 23 is fixed to the shaft 41. Moreover, a washer 42 is fitted on the fixed part of the left upper edge portion 2a of the body and the right upper edge portion 2b of the body. The shaft 41 is hollow, and an FPC 45 for electrically connecting the camera unit 31 and the body printed board 51 and a lead wire 48 for electrically connecting the receiver 32 and the body printed board 51 penetrate through a cavity 41a. More specifically,

the FPC 45 having an FPC connector 46 connected to the body printed board 51 and an FPC connector 47 connected to the camera unit printed board 33 provided on both ends thereof and a lead wire 48 having a lead wire connector 49 connected to the board  
5 printed board 51 and a lead wire connector 50 connected to the receiver 32 provided on both ends thereof penetrate through the cavity 41a in the shaft 41.

The FPC 45 originally has a shape shown in an expanded view of Fig. 8A, and a central portion thereof is twisted to  
10 form a loop 45a, and the FPC connectors 46 and 47 provided on the both ends are then connected thereto. By such a structure that the FPC 45 is rotated interlockingly with the rotation of the camera receiver unit 9 to loosen the twist of the loop 45a, the FPC 45 can be prevented from being broken.

15 As shown in Fig. 7, the camera receiver unit case 23 is constituted by the first case 23a and the second case 23b, and the first engaging portion 23c and the second engaging portion 23d which are provided on the center of an upper end are engaged with each other. Thus, the upper end of the case is fixed. The  
20 lower end of the case is fixed with a pair of screws 43 and 44.

Description will be given to the operation of the mobile telephone 1 having a video camera which is constituted as described above. First of all, in the case in which the mobile telephone 1 having a video camera is to be used as a hands free  
25 mobile television telephone, the camera receiver unit 9 is

stopped in the state shown in Fig. 1. A user carries out calling while seeing the video camera section 10 turned toward the front face of the camera receiver unit 9. The voice of a calling party is output from the receiver section 11 turned toward the back face of the body 2, and the user's voice is input from the microphone 7 provided in the lower edge portion of the front face of the body 2. Alternatively, a plug of a head set may be inserted into the head set jack 4 so that calling can be carried out by using a microphone and a receiver which are provided in the head set. At this time, if the calling party is a television telephone, an image picked up by the video camera section 9 is displayed on the display section of the television telephone of the calling party and an image picked up by the video camera of the television telephone of the calling party is displayed on the display section 4. If the calling party is not the television telephone, an image is neither transmitted nor received. By rotating angle detecting means of the camera receiver unit provided in the body which is not shown, the rotating angle of the camera receiver unit 9 is detected. When the receiver section 11 is turned toward a back face, the voice output level of the receiver section 11 is suitably increased more than that obtained when the receiver section 11 is turned toward a front face.

Moreover, when the camera receiver unit 9 is rotated by 180 degrees in the state shown in Fig. 1 so that the front face

of the video camera section 10 is turned toward the back face side of the body 2, an object on the back face side of the body 2, for example, the situation of an accident spot or a scene of a fire or a beautiful scenery which is being seen by a caller is photographed and transmitted. The caller can confirm, through the display section 5, that an object on the back face side of the housing body is photographed, and can therefore modify the direction of a camera easily such that a portion to be shown can come out well. It is possible to explain the situation to be shown to the calling party in a voice and to carry out a relay from the spot through the television telephone.

Furthermore, when the mobile telephone 1 having a video camera is to be used as an ordinary hand set type mobile telephone, the camera receiver unit 9 is rotated by 180 degrees in the state shown in Fig. 1 to turn the front face of the receiver section 11 toward the front face side of the body 2. The user causes an ear to touch the surface of the receiver section 11, and listens to the voice of the calling party and inputs his (her) own voice by using the microphone 7 provided in the lower edge portion of a front cover 2. At this time, the video camera section 10 is turned toward the back face. Therefore, it is possible to prevent stains from being made by the touch of the user's hair or skin.

On the other hand, when the mobile telephone 1 having a

video camera is to be used as a video camera for photographing an object present in a rear part, the camera receiver unit 9 is rotated by 180 degrees in the state shown in Fig. 1 to turn the front face of the video camera section 10 toward the back face side of the body 2. An image picked up by the video camera section 10 is displayed on the display section 5 and the user can carry out photographing while seeing the display section 5. The image data thus picked up are stored in an internal memory (not shown). At this time, a voice on the periphery of the object may be input from the microphone 7. The image data and voice data stored in the memory can be then transmitted to another mobile telephone or can be output to a personal computer through an external connecting terminal (not shown).

As described above, according to the invention, there can be provided a mobile information communicating terminal device having a video camera in which a camera receiver unit having a video camera section and a receiver section mounted thereon is pivotally supported in a vertical direction with respect to the upper edge face of a mobile information communicating terminal device body so that the vertical inversion processing of an image signal is not required when the device is to be used as a television telephone for photographing a caller's own face and when the device is to be used as a video camera for photographing an object present in a rear part.

Moreover, it is possible to obtain an advantage that the

image of an object on the front face of a housing body can be optionally transmitted and the image of an object on the back face of the housing body can be optionally transmitted when the device is to be used as a hands free type television telephone.

**CLAIMS**

1. A mobile information communicating terminal device with a video camera comprising:

5 a body of the communication terminal device; and  
a camera receiver unit having a video camera section and a speaker section mounted, which is pivotally supported in a vertical direction with respect to an upper edge face of the body.

10

2. The mobile information communicating terminal device according to claim 1, wherein a light receiving face of the video camera section and a voice output face of the speaker section are separated into a front-side and a back-side of the  
15 camera receiver unit.

3. The mobile information communicating terminal device according to claim 2, wherein the body has left and right upper edge portions protruded upward and the camera receiver  
20 unit is provided between the protruded portions.

4. The mobile information communicating terminal device having a video camera according to claim 3, wherein the camera receiver unit has a concave portion on both side surfaces  
25 and the protruded portions have a member for pressing the



concave portion by elastic force.

5. A mobile information communicating terminal device provided having a television telephone function, comprising:
- 5 a body of the communicating terminal device; and
- a camera unit pivotally supported on the body in a vertical direction, wherein calling can be carried out in states in which the camera unit is turned toward a front face of a body housing and toward a back face thereof.

FIG.1

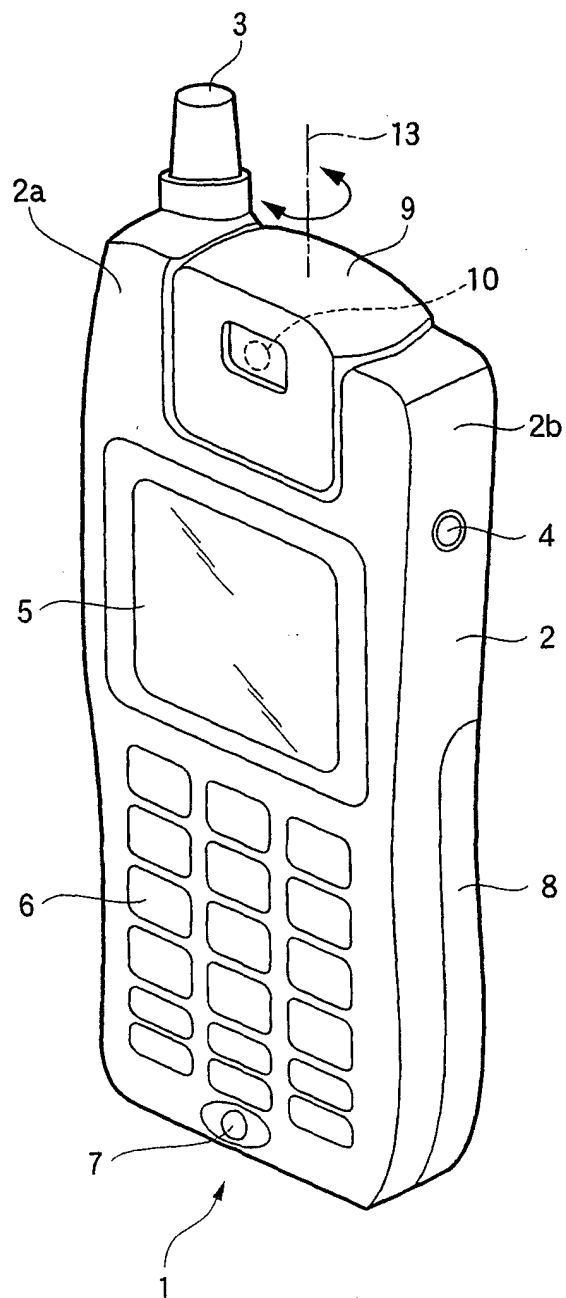


FIG.2

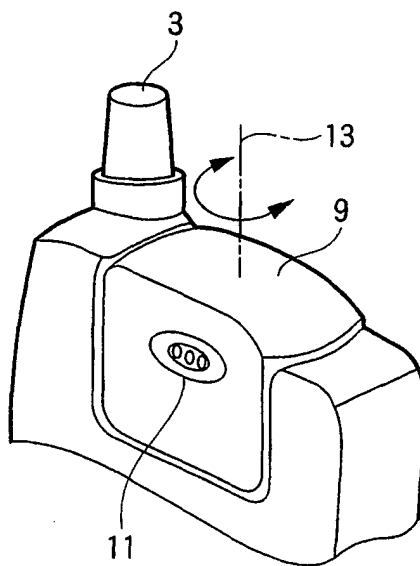


FIG.3

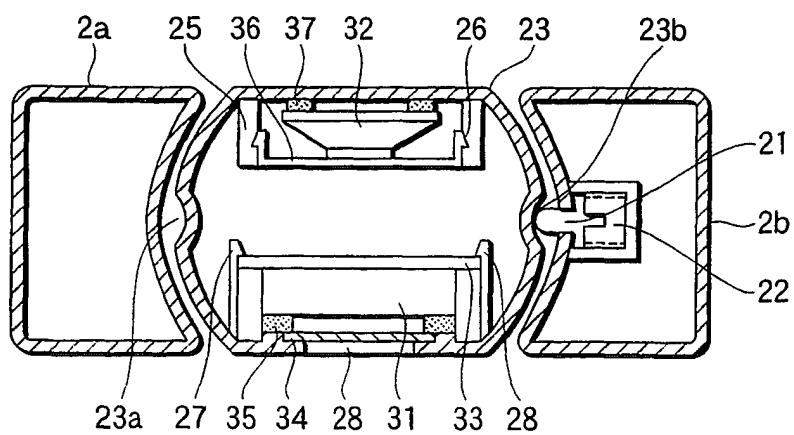




FIG.5

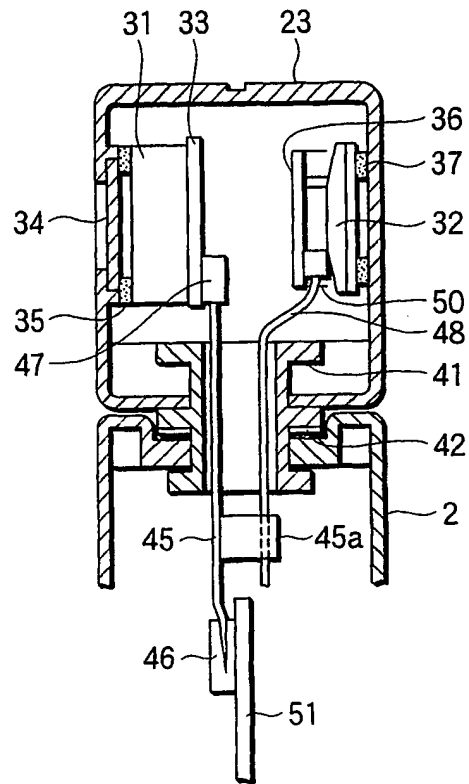


FIG.6

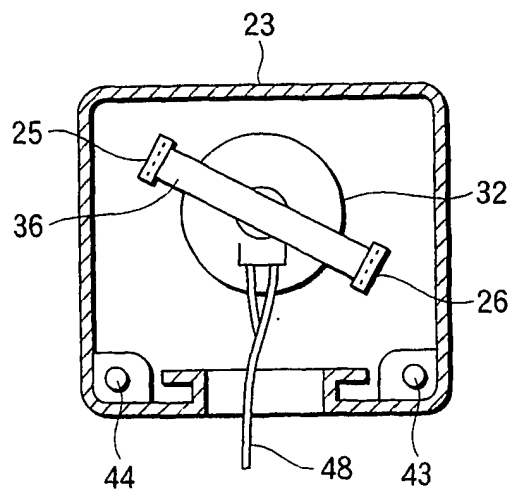


FIG.7

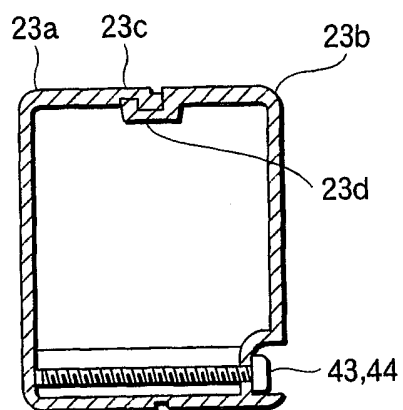


FIG.8B

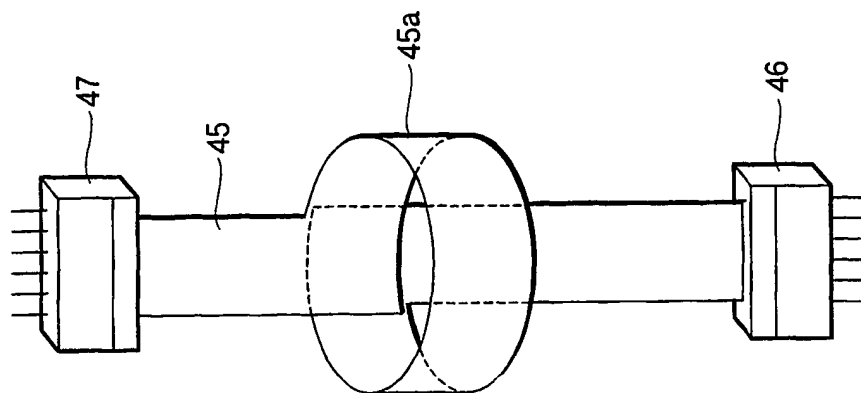


FIG.8A

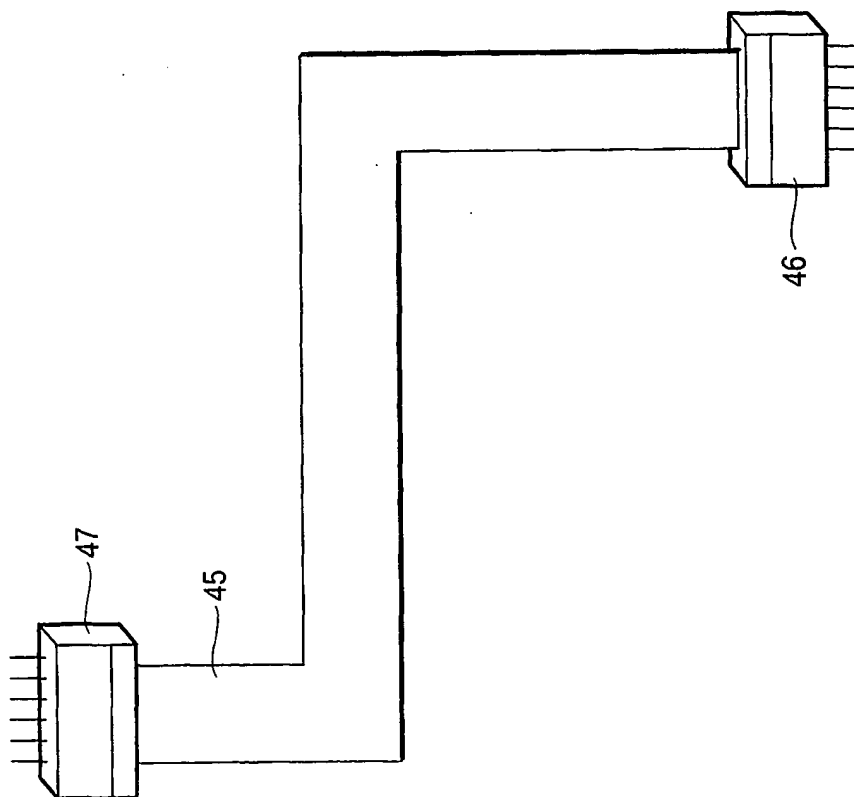
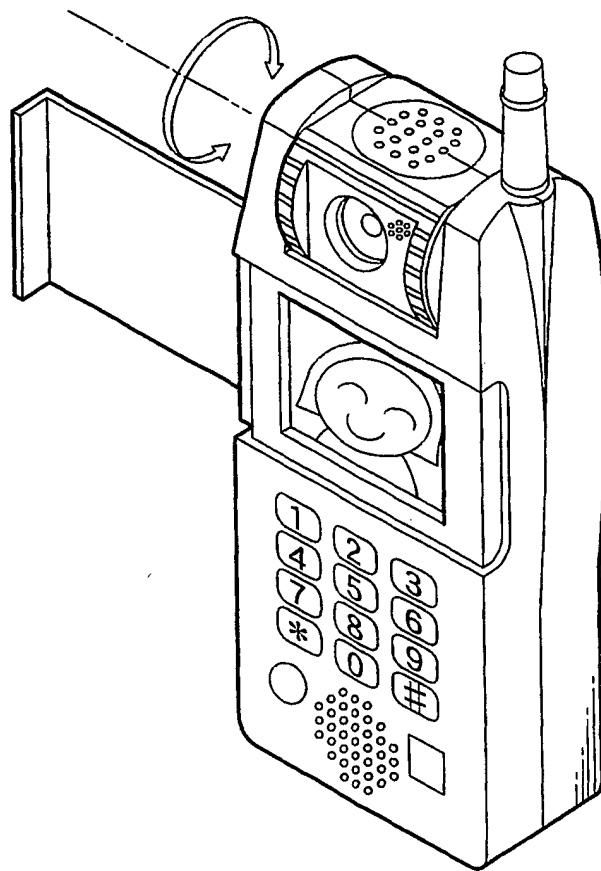


FIG.9





# INTERNATIONAL SEARCH REPORT

Int. Application No  
PCT/JP 01/01369

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 7 H04N7/14 H04N5/225

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
IPC 7 H04N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

PAJ, EPO-Internal

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	PATENT ABSTRACTS OF JAPAN vol. 1997, no. 09, 30 September 1997 (1997-09-30) & JP 09 130489 A (SHARP CORP), 16 May 1997 (1997-05-16) abstract	1, 2, 5
Y	---	3
Y	PATENT ABSTRACTS OF JAPAN vol. 1997, no. 03, 31 March 1997 (1997-03-31) & JP 08 294030 A (HITACHI LTD), 5 November 1996 (1996-11-05) cited in the application abstract ---	3
	--- -/--	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

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# INTERNATIONAL SEARCH REPORT

Int. Application No.

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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>US 6 009 336 A (WILLIAMS DANIEL L ET AL)  28 December 1999 (1999-12-28)  column 11, line 39 - line 58; figure 13  -----</p>	1,5

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/JP 01/01369

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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JP 08294030 A	05-11-1996	NONE	
US 6009336 A	28-12-1999	CN 1170329 A	14-01-1998
		DE 19726602 A	29-01-1998
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		JP 10098561 A	14-04-1998

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